

DEFENSE THREAT REDUCTION AGENCY SBIR FY10.1 Proposal Submission

The mission of the Defense Threat Reduction Agency (DTRA) is to safeguard the United States and its allies from weapons of mass destruction (chemical, biological, radiological, nuclear and high-yield explosives) by providing capabilities to reduce, eliminate and counter the threat and mitigate its effects. This mission includes research and development activities organized into chemical/biological, nuclear, WMD counter-force, and systems engineering technology portfolios. From these activities, DTRA administers two SBIR programs. One is affiliated with the Chemical-Biological Defense Program and appears as a separate component under this solicitation. The other is drawn from the nuclear, WMD counter-force, and systems engineering portfolios and is described herein. Communications for this program should be directed to:

Defense Threat Reduction Agency
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Use of e-mail is encouraged.

The DTRA SBIR program complements the agency's principal technology programs to detect/locate/track WMD; interdict or neutralize adversary WMD capabilities; protect against and restore following WMD use; attribute parties responsible for WMD attacks; and provide situational awareness and decision support to key leaders. SBIR topics reflect the current strategic priorities where small businesses are believed to have capabilities to address challenging technical issues. DTRA supports efforts to advance manufacturing technology through SBIR, where the challenges of such technology are inherent to technical issues of interest to the agency.

PROPOSAL PREPARATION AND SUBMISSION

Proposals (consisting of coversheets, technical proposal, cost proposal, and company commercialization report) will be accepted only by electronic submission at <http://www.dodsbir.net/submission/>. Paragraph 3.0 of the solicitation (found at <http://www.dodsbir.net/solicitation/>) provides the proposal preparation instructions. Consideration is limited to those proposals that do not exceed \$100,000 and seven months of performance. The period of performance may be extended up to five additional months following award, but such extensions may delay consideration for Phase II proposal invitation. Proposals may define and address a subset of the overall topic scope. Proposals applicable to more than one DTRA topic must be submitted under each topic.

PROPOSAL REVIEW

During the proposal review process employees from BRTRC, Inc., and Northrop Grumman Information Technology (NGIT) will provide administrative support for proposal handling and will have access to proposal information on an administrative basis only. Organizational conflict of interest provisions apply to these entities and their contracts include specifications for non-disclosure of proprietary information. All proposers to DTRA topics consent to the disclosure of their information to BRTRC and NGIT employees under these conditions.

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DTRA will evaluate Phase I proposals using the criteria specified in paragraph 4.2 of the solicitation with technical merit being most important, followed by principal investigator qualifications, and commercialization potential. Topic Points of Contact (TPOC) lead the evaluation of all proposals submitted in their topics.

SELECTION DECISION AND NOTIFICATION

DTRA has a single source selection authority (SSA) for all proposals received under one solicitation. The SSA either selects or rejects Phase I proposals based upon the strengths and weaknesses identified in proposal review plus other considerations including limitation of funds and balanced investment across all the DTRA topics in the solicitation. Balanced investment includes the degree to which offers support a manufacturing technology challenge. To balance investment across topics, a lower rated proposal in one topic could be selected over a higher rated proposal in a different topic. DTRA reserves the right to select all, some, or none of the proposals in a particular topic.

Following the SSA decision, the contracting officer will release notification e-mails through DTRA's SBIR evaluation system for each accepted or rejected offer. E-mails will be sent to the addresses provided for the Principal Investigator and Corporate Official. Offerors may request a debriefing of the evaluation of their proposal. Debriefings would be viewable at <https://www.dtrasbir.net/debriefing> and require password access. Debriefings are provided to help improve the offeror's potential response to future solicitations. Debriefings do not represent an opportunity to revise or rebut the SSA decision.

For selected offers, DTRA will initiate contracting actions which, if successfully completed, will result in contract award. DTRA Phase I awards are issued as fixed-price purchase orders with a 6-month period of performance that may be extended, as previously discussed. DTRA may complete Phase I awards without additional negotiations by the Contracting Officer or opportunity for revision for proposals that are reasonable and complete.

DTRA's projected funding levels support a steady state of 18 Phase I awards annually over multiple solicitations. Actual number of awards may vary.

DTRA Phase I awards for this solicitation will be fully funded with FY10 appropriation available on or after December 1, 2009. Awards will be subject to availability of those funds and will occur by the end of June '10. DTRA manages SBIR as an ongoing program and does not classify individual Phase I awards as new program starts for the purpose of Continuing Resolution Authority.

CONTINUATION TO PHASE II

Only Phase II proposals provided in response to a written invitation from a DTRA contracting officer will be evaluated. DTRA invitations are issued based on the degree to which the offeror successfully proved feasibility of the concept in Phase I, program balance, and possible duplication of

other research. Phase II invitations are issued when the majority of Phase I contracts from the preceding solicitation are complete, typically early spring. Phase I efforts which were delayed in award or extended after award will be considered for invitation the following year.

DTRA's projected funding levels support a steady state of 7-10 new Phase II awards annually to meet an objective of continuing approximately 50 percent of Phase I efforts to Phase II. Actual number of awards may vary.

OTHER CONSIDERATIONS

DTRA does not utilize a Phase II Enhancement process. While funds have not specifically been set aside for bridge funding between Phase I and Phase II, DTRA does not preclude FAST TRACK Phase II awards, and the potential offeror is advised to read carefully the conditions set out in this solicitation.

Notice of award will appear first in the Agency Web site at <http://www.dtra.mil>. Unsuccessful offerors may receive debriefing upon written request only. E-mail correspondence is considered to be written correspondence for this purpose and is encouraged.

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DTRA SBIR 10.1 Topic Descriptions

DTRA101-001

TITLE: Software and Systems Engineering-Human System Integration Modeling Methodology

TECHNOLOGY AREAS: Information Systems, Sensors, Electronics, Battlespace, Human Systems

OBJECTIVE: Current Software and System Engineering (SSE) methodologies for Human System Integration provide a process or sets of processes by which to develop a SSE-HSI scheme of how one integrates humans, operations, systems, and technical perspectives with requirements, analysis, and verification for a complete systems picture. What is missing is the ability to do this with an easy-to-use template, especially for those who are not “engineering or non-technically inclined.” This is becoming more significant as DoD becomes involved with NGO/USGA mission partners in Irregular Warfare-Humanitarian Assistance and Disaster Relief efforts.

Standard guidelines and methodologies provide logical sequences to show concurrent and iterative SSE processes of human system integration design, e.g., how one activity will impact others in the design process(es). However, the SSE-HSI architectural design requires one to know how to build engineering schemes, understand functional allocations, and use proper engineering/technical symbols for process/work flow. Therefore, the objective is to create forms or templates to easily formulate a human-system integration architectural design without engineering or technical expertise. The concept should be similar to that of commercial tax preparation software (e.g., Turbo Tax, etc.).

Tax preparation software provides a software package that easily steps an individual through the proper forms or templates to use; prompts the individual in what information to enter, and updates changes across all appropriate forms or templates without the individual having to be an accountant.

The final step of the HSI-SSE process should be a non-technical visual representation of the overall SSE design for Workflow, Test and Evaluation, and Implementation.

For example, non-government organizations (NGOs) are testing and evaluating systems alongside DoD for IW-Civil Affairs and have little to no experience in engineering or technical architectural design. This can be seen in the Naval Postgraduate School’s RELIEF Program where NGOs test and evaluate their products for such efforts as DoD’s Distributed Essential Services in Afghanistan (DES-A) Leveraging Information, Communications and Distributed Power to Build Partner Capacity. The NGOs come together at Camp Roberts with a written MS Word document of how they are going to test and evaluate their products for use with DoD’s. The documents are not written in any approved format that DoD recognizes. When the NGO ask for a SSE architectural design form to plug in their workflow, DoD provides the guidance books and references such as the Human System Integration Handbook.

Therefore, by providing a refined SSE methodology that incorporates forms/templates with a “step though” type process, the NGO and other mission partners would be able to convert their workflow into something more adaptable that DoD could accept and integrate into their overall planning package.

Systems Engineering Tool Recommendation: To effectively and efficiently perform this process, the use of the SSE tool, CORE™ is highly recommended. CORE™ provides an integrated SE environment that can support all the tasks that have been identified in this process. If CORE is not used, the task will require multiple tools that will complicate the process in terms of redundancy, traceability and documentation.

DESCRIPTION: The evaluation shows that no standard software SSE-HSI modeling methodology is available for the non-technical/engineering user to build architectural designs for effective use by DoD. Most SSE-HSI design workflow is still done through methods of analyses of written standards and guidelines. This current approach continues to produce incompatible human system interfaces; misalignment of operator capabilities or functions; incomplete understanding of underlying infrastructures and gaps in mission; and safety criticality with mission partners.

All of the above leads to frequent reengineering of equipment, technologies, weapons, infrastructures, procedures, training, and so forth. Therefore a standard software SSE-HSI modeling methodology facilitated with a suite of templates is required for more efficient human-system/technological development specifically for non-technical/engineering users.

Using a standard modeling SSE-HSI methodology for DoD and its mission partners will reduce time, cost and reengineering of equipment or systems by identifying the gaps between the software, hardware, and human functional allocations.

Risk Factor: The risk to DTRA is minimal and high in benefit. The intent is to utilize an existing SSE product and refine its methodology by adding easy-to-use forms/templates for implementation/building of SSE-HIS, and an adaptable visualization of the workflow.

PHASE I:

- A software SSE-HSI methodology with supporting executable notations that shows the types of forms and templates to be developed for management and design workflow for SSE-HSI.
- This software methodology change should show what the templates would look like; the simplicity of use by non-technical/engineering users, and how the results will be represented visually to gaps, critical paths, etc.
- Develop a proof-of-concept by developing one or two templates and the visualization of the results.

PHASE II:

- Generating an extension of Phase I prototype with an integrated suite of SSE-HSI modeling templates. Notional templates may be:
 - o Concept of Operations (CONOPS) Templates
 - o HSI-SSE Operational Behavior Template: A series of “engineering” steps that would facilitate a suite of modular templates for the user to fill in relative information
 - o Functional Allocations HSI Template: detailed roles, relationships/interfaces
 - o HSI Operational Scenarios Templates for Test and Evaluation
 - o HSI Resource Template for requirements and interface constraints
 - o Visual representation of how to dynamically execute the HIS-SSE architect to show gaps and resolutions.
- The software SSE-HSI modeling methodology will show adaptive interface(s); show a modular design concept for the suite of templates and show integration between and among the templates.
- Show proof-of-concept by applying the methodology to a use case. The POC would show how the methodology provides easy of use for non-technical/engineering people. Provides better understanding of the human functional requirements at the onset of the SSE-HSI architectural design for human interoperability across net-centric and net-enabled environments.

PHASE III DUAL USE APPLICATIONS: Application of the SSE-HSI modeling methodology with supporting templates (data fields and links) could be user implemented upon completion of Phase II both within the DoD and commercial environment for a number of varied applications, e.g., Irregular Warfare and Rapid Technologies, Biometrics and Countermeasure Integration, Integration of CI Technologies and Human Requirements, Social System Networking and C2, Intelligence Integration of Technologies and Human Interfaces, Humanitarian Assistance/Disaster Relief, etc.

REFERENCES:

1. Handbook of Human Systems Integration; Harold R. Booher, ISBN: 978-0-471-02053-0.
2. The Acquisition Process, Human systems integration (HSI), Ensuring design & development meet human performance capability early in acquisition process; James J. Clark and Robert K. Goulder.
3. A Handbook of Software and Systems Engineering: Empirical Observations, Laws and Theories Albert Endres and Dieter Rombach, Addison Wesley, ISBN: 0321154207.

4. Competitive Engineering: A Handbook for Systems Engineering, Requirements Engineering, and Software Engineering Using Planguage, Tom Gilb. 2005 Elsevier.

5. Human-system integration in the system development process: a new look; Richard W. Pew, Anne S. Mavor, Committee on Human-System Design Support, National Research Council, 2008, National Academy Press.

KEYWORDS: Human integration, system integration, human-system, human factors engineering, software and system architectural design, modular design, re-engineering.

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